Synopsis of Original Research Paper

# Development of a new method for quantifying facial morphology (facial morphological analysis algorithm) using facial wrinkles

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In this study, we aim to establish a method for measuring the face by analyzing CT images taken using facial expression wrinkles. First, we focused on the cheek lines to investigate changes in face after surgery, and devised a program that can easily measure these changes. This study evaluated the changes in cheek soft tissue after orthognathic surgery using facial photographs and cephalograms. Cheek soft tissue was defined as the cheek line, which is the contour of the cheek starting from the infraorbital region and continuing to the corners of the mouth on a lateral photograph. Seventy-eight Japanese patients (48 women and 30 men) with skeletal class III underwent maxillary advancement and mandibular setback. The changes in cheek size and the position of the cheek points on the cheek line after surgery were examined experimentally using a previously proposed image analysis software program. The maxillary advancement was 4.4 mm and the mandibular setback was 4.4 mm, and there was no significant sex difference in skeletal movement. The ratio of change in cheek size increased (mean 2.7) and showed an anterior change at the points on the cheek line. The change in cheek point showed a significant sex difference; the upper cheeks were more advanced in men. Cheek changes were positively correlated only with maxillary advancement, and the upper cheek points in men was also showed a correlation. Orthognathic surgery for skeletal class III affected cheek bulge, and maxillary advancement had a greater effect on the cheek line. There were sex differences in the postoperative changes in the cheek line, with the changes in the cheek contour in women increasing radially, whereas the changes in men tended to be similar to skeletal movement.